Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2019

TECHNICAL MATHEMATICS P1

MARKS: **100**

TIME: **2 hours**

XTMATE1

This question paper consists of 7 pages, including 1 diagram sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions in the question paper.

1. This question paper consists of SIX questions.
2. Answer ALL the questions.
3. A DIAGRAM SHEET is attached at the back of this question paper. Use it to answer QUESTION 6.1.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers to TWO decimal places, unless stated otherwise.
8. Diagrams are not necessarily drawn to scale.
9. Write neatly and legibly.

QUESTION 1

1.1 Between which TWO integers does $\sqrt{62}$ lie? (2)

1.2 Write 72 as a binary number. (2)

1.3 Determine the product of 1110_2 and 111_2. Leave your answer in binary form. (2)

1.4 Write in scientific notation: $0,000872$ (1)

1.5 Determine the value of the following if $x = -3$ and $y = 2$:

$5x^2 + 3xy - 2y^2$ (2)

[9]

QUESTION 2

2.1 Determine the product of the following and simplify:

2.1.1 $5(7x - 5y)^2$ (4)

2.1.2 $(2a + 3)(4a^2 - 6a + 9)$ (2)

2.1.3 $(3 + 4i)(-2 - 5i)$ where i is a complex number (3)

2.2 Simplify the following:

2.2.1 $\dfrac{3^{x+1}.81^x}{9^{x+2}}$ (4)

2.2.2 $\dfrac{(9x^2)^4 \times 3x^2}{27}$ (3)

[16]

QUESTION 3

Factorise completely:

3.1 x^2+5x-6 (2)

3.2 $-4a^3+32$ (3)

3.3 $\dfrac{x^2(x+7)-2x(x+7)+(x+7)}{(x+7)(x-1)^2}$ (4)

[9]

QUESTION 4

4.1 Solve for x:

4.1.1 $9^{x-1}=81$ (4)

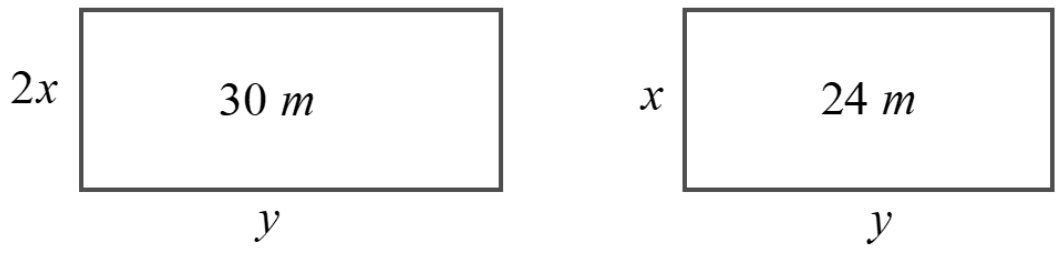
4.1.2 $(x+5)(2x-3)=0$ (2)

4.1.3 $\dfrac{2x+16}{x}=10$ (3)

4.2 Solve the following inequality and represent your answer on a number line:
$2(x+4)>x+6$ (3)

4.3 Make x the subject of the following formula:
$\dfrac{x^2}{a^2}+\dfrac{y^2}{b^2}=1$ (4)

4.4 A farmer wants to build 2 rectangular chicken runs. One has a perimeter of 30 *m* and the other has a perimeter of 24 *m*.



4.4.1 Write equations to represent the two different perimeters of the chicken runs. (2)

4.4.2 Hence solve for x and y. (5)

4.5 Two trucks undergo a journey to deliver goods. One driver maintains an average speed of 120 *km* / *h* and the other an average speed of 160 *km* / *h*. If the faster truck driver arrives 2 hours before the slower one, how long did the slower truck driver take to reach the destination? (6)

[29]

QUESTION 5

5.1 Sylvia wants to buy an expensive hairdryer from London. It costs £100. The current exchange rate is £1 = R17,58 but Sylvia anticipates that the exchange rate will be £1 = R15,00 in a month's time.

5.1.1 How much will the hairdryer cost in Rand if she buys it now? (2)

5.1.2 How much will the hairdryer cost in a month's time if she is right and the exchange rate goes down to £1 = R15,00 as expected? (1)

5.1.3 How much is she saving by waiting a month? (1)

5.2 Mina buys a fridge for R10 000. A cash deposit of 12% is required. The balance of the amount is paid off on a hire-purchase agreement. The interest paid is 25% per year and she pays equal instalments for 5 years.

5.2.1 Calculate the deposit she must pay. (2)

5.2.2 Calculate the total amount she pays for the fridge, including the deposit. (4)

5.2.3 Calculate the monthly instalment. (2)

5.3 Claire wants to save up money to buy herself a flat screen TV. She invests R6 000 at 15% compound interest per year for 5 years.
Determine her investment after the 5 years. (3)

[15]

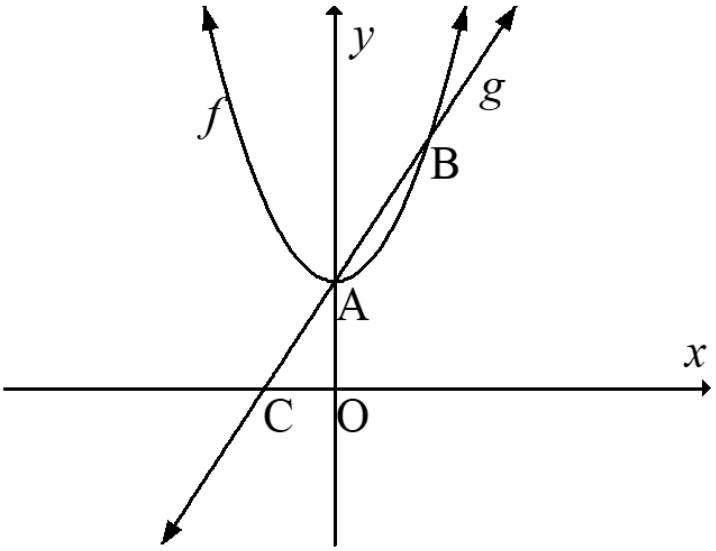
QUESTION 6

6.1 Given the functions: $h(x)=\frac{4}{x}$ and $p(x)=3^x$

6.1.1 Complete the table as provided on the DIAGRAM SHEET. (3)

6.1.2 Use the DIAGRAM SHEET provided to sketch the graphs of $h(x)$ and $p(x)$ on the same system of axes. Show all the intercepts with the axes and the asymptotes. (5)

6.2 The graphs of $f(x)=x^2+3$ and $g(x)=2x+3$ are given below. A and B are x-intercepts of the graph of f and C is the turning point of f. The graph of g meets the graph of f at C and D. D is the y-intercept of g.



Determine the coordinates of A, B and C. (8)

6.3 Write down the following:

6.3.1 The domain of g (1)

6.3.2 The range of f (1)

6.4 Use your graph to determine the following:

6.4.1 The value of x for which $g(x)>0$. (2)

6.4.2 The value of x for which $f(x)=g(x)$. (2)

[22]

TOTAL: 100

DIAGRAM SHEET

NAME OF LEARNER: …….. **CLASS**: ……

SCHOOL: ……

QUESTION 6.1

x	-4	-3	-2	-1	0	1	2	3	4
h(x)									
p(x)